APPENDIX C
OF
CLEANUP ACTION PLAN
ABLE PEST CONTROL SITE
KENMORE, WASHINGTON
FARALLON PN: 602-002

SAMPLING AND ANALYSIS/COMPLIANCE MONITORING PLAN

Submitted By
Farallon Consulting, L.L.C.
320 3rd Avenue NE, Suite 200
Issaquah, WA 98027

For:
Ms. Sharon Schlittenhard

Ms. Sharon Keller
Personal Representative
Estate of Sheridan Martin

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Prepared by

Riley Conkin
Associate Geologist

Reviewed by

Peter Jewett
Principal

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1.0 INTRODUCTION

This final draft Sampling Analysis/Compliance Monitoring Plan (herein referred to as the Plan) combines the Sampling and Analysis Plan (SAP), prepared in accordance with WAC 173-340-820, and the Compliance Monitoring Plan (CMP), prepared in accordance with WAC 173-340-410. The Plan is incorporated within the draft Cleanup Action Plan (CAP) for the cleanup of the 62nd Avenue site located in Kenmore, Washington (the site). The objective of the Plan is to ensure that sample collection, handling, and analysis during implementation of the CAP will result in data that meet the data quality objectives for cleanup of the site.

The purpose of the Plan is to provide specific methods and procedures for Performance Monitoring, Confirmational Monitoring, and waste characterization. Protection monitoring is addressed in the Health and Safety Plan (HASP) included with the CAP. Performance Monitoring will provide analytical results:

- During the excavation to guide the areal and vertical extent of soil removal;
- For *in-situ* soil samples for waste characterization; and,
- Confirmation that off-site migration of soil and/or vadose zone groundwater is not occurring during the excavation.

Confirmational Monitoring will confirm that the final cleanup levels are met for soil and vadose zone groundwater at the defined points of compliance.

2.0 PERFORMANCE MONITORING

Performance Monitoring will consist of collecting *in-situ* soil samples from the base and sidewalls of each excavation area and wastewater samples from captured vadose zone groundwater, storm water, and decontamination washwater for laboratory analysis. The procedures for collection, handling, and analysis are discussed in this section.

2.1 SOIL PERFORMANCE MONITORING

2.1.1 Soil Sample Collection

Performance soil samples will be collected from the proposed excavation areas to guide the excavation and to serve as confirmation samples where cleanup levels are attained. As defined in the CAP, the site has been divided into three general excavation subareas: the Contamination Reduction Excavation Subarea (CRC), located on the north portion of the site; the Exterior Excavation Subarea (EXT), which includes all areas outside the residence with the exception of the CRC Subarea; and, the Interior Excavation Subarea (INT), which includes the small area beneath the southwest corner of the existing residence. The CAP segregated the depth of the excavation within each of the subareas by lift: Lift 1 extends from the surface to 1-foot below ground surface (bgs); Lift 2 extends from 1 to 2 feet bgs; and Lift 3 extends from 2 to 3 feet bgs. The areas to be excavated within each of these subareas are numbered within each lift and are based on the soil categories defined in the CAP and Environmental Media Management Plan (EMMP).

Figure 1 shows specific excavation areas based on the soil categories within the EXT, INT, and CRC Subareas in Lift 1. The expected excavation areas include: nine areas of excavation within the CRC; 15 areas of excavation within the EXT; and, two areas of excavation within the INT. Figure 2 shows the areas of excavation in the EXT, INT, and CRC Subareas for Lift 2; Figure 3 shows the areas of excavation for Lift 3. The numbered excavation areas for each subarea and lift will be used as a guide for the site excavation and Performance Monitoring.

Soil samples will be collected from each excavation area using a grid system and will include *in-situ* soil samples collected from the bottom and sidewalls of each excavation. The grid system will be based on 20 foot (ft) by 20 ft sampling cells (400 square feet [ft^2]) that will be divided into four equal quadrants (10 ft by 10 ft [100 ft^2]) as shown on Figure 4. The sampling cell will overlay the excavation area completed for each soil category defined by the *in-situ* soil samples collected for the RI/FS and shown on Figures 1, 2 and 3. Each cell will be identified by the excavation area number (1), alphabetically (A) and the quadrants within each cell (NW, NE, SW or SE) corresponding with the respective position in the quadrant. Figure 4 provides a schematic layout of the sampling points within a sampling cell. A total of 5 soil samples will be analyzed from each cell; 1

discrete soil sample from the bottom of each quadrant in the cell will be composited to a single sample for analysis, and a discrete sample from each the 4 sidewalls collected at the midpoint of each sidewall.

The four discrete sidewall samples and the composited bottom sample will be submitted for laboratory analysis from each cell with the exception of soil samples collected from Category 4 Soils excavations. The discrete bottom samples will be retained for future analysis if necessary. The individual Performance Monitoring soil samples collected from the bottom of each quadrant within the sampling cell from the Category 4 Soils excavation areas will not be composited but will be run separately. These additional data will be used to more accurately define the areas of Category 4 Soils that will require excavation.

2.1.2 Soil Sampling Frequency

The soil sampling frequency will be determined by the size of the area of excavation. The following table presents the frequency of soil samples to be analyzed from an excavated area:

AREA OF EXCAVATION (ft^2)	NUMBER OF SIDEWALL SAMPLES	NUMBER OF BOTTOM SAMPLES
0 TO 100	4	1
101 TO 200	4	2
201 TO 300	4	3
301 TO 400	4	4

2.1.3 Soil Sample Collection And Handling Procedures

Soil samples will be collected directly from undisturbed soil using a stainless steel spoon or similar hand-sampling tool in excavations less than four feet deep. Soil samples will be collected from the backhoe bucket with a stainless steel spoon or similar hand-sampling tool in excavations deeper than four feet, if any are necessary. Each soil sample will be transferred directly from the stainless steel spoon into a laboratory prepared glass sample jar using a clean stainless steel trowel. The sample jars will be completely filled, immediately sealed with Teflon lined screw caps, and placed in a field cooler on ice pending delivery to the analytical laboratory. The sample containers will be clearly labeled using a unique sample number and chain-of-custody procedures will be followed for all sampling events.

2.1.4 Soil Sample Location Survey

Prior to excavation, Farallon will set-up several survey benchmarks at the site to monitor excavation and sampling elevations as the cleanup progresses. The benchmarks will be

established on the foundation of the residence and tied into the existing topographic survey of the site, which was completed during the Remedial Investigation/Feasibility Study (RI/FS). Checks of the excavation progress will be performed periodically during the cleanup as each proposed excavation lift is completed at the site.

2.1.5 Analytical Testing

Performance Monitoring soil samples will be analyzed for organochlorine pesticides using USEPA Method 8081. A detailed description of analytical methods is presented in Section 5.0 of this Plan.

2.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality Assurance/Quality Control (QA/QC) soil and water samples will be collected during the course of the cleanup action to provide for data validation. The following types of QA/QC samples will be collected and shipped to the laboratory with the other samples. The type and frequency of these field QA/QC samples are summarized below. The exact number of QA/QC samples will be dependent on the number of soil and groundwater samples collected during the site cleanup. However, the frequency given below will be followed.

- Blind decontamination rinsate blank: 1 water sample per 20 *in-situ* soil samples;
- Split field duplicates: 1 soil sample per 10 *in-situ* soil samples;
- Decontamination Rinsate Sample: 1 rinsate sample after collection of 20 *in-situ* soil samples.

2.3 AIR PROTECTION MONITORING

Air quality protection monitoring will be performed on a daily basis to monitor potential fugitive dust generated from excavation activities. A Miniram air quality monitoring instrument will be used to monitor air quality in the breathing zone during excavation activities. The air protection monitoring criteria are outlined in the Health and Safety Plan (HASP) incorporated as Appendix D within the CAP.

3.0 CONFIRMATIONAL MONITORING

This section presents the specific requirements for collection of confirmational samples required by the compliance monitoring plan (WAC 173-340-410). Confirmational Monitoring will consist of collecting *in-situ* soil samples from the base of completed excavation areas and vadose zone groundwater samples after completion of the removal of contaminated soil. The procedures for collecting, handling and analysis of Confirmational Monitoring samples are discussed in this section.

3.1 CONFIRMATIONAL SOIL SAMPLING

Confirmational soil sampling will be performed to confirm the long-term effectiveness of the final cleanup action once cleanup standards have been attained as described in the CAP. Performance soil sampling locations will be used as confirmational sampling points if the analytical results of Performance Monitoring soil samples indicate that cleanup levels have been attained. However, in areas where the analytical results of Performance Monitoring sampling indicates that cleanup levels have not been attained, additional excavation will be required and confirmational samples will then be collected from the final excavation limits to confirm that the cleanup levels have been attained. Confirmational soil samples will also be collected on the north side of the Preschool property.

Confirmational soil samples will be collected from individual excavations and the Preschool property using the same sampling methodology as described in Section 2.1.1 Soil Sample Collection for Performance Monitoring.

3.1.1 Sampling Frequency

Confirmational soil sampling frequency of final excavation areas will be the same as those described in Section 2.1.2 Soil Sample Frequency for Performance Monitoring

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3.1.2 Sample Collection and Handling Procedures

Soil samples will be collected directly from undisturbed soil using a stainless steel spoon in excavations less than four feet deep. Soil samples will be collected from the backhoe bucket with a stainless steel spoon at the surface for excavations deeper than four feet. Each soil sample will be transferred directly from the stainless steel spoon into a laboratory prepared glass sample jar using a clean stainless steel trowel. The sample jars will be completely filled, immediately sealed with Teflon lined screw caps, and placed in a field cooler on ice pending delivery to the analytical laboratory. The sample containers will be clearly labeled using a unique sample number and chain-of-custody procedures will be followed for all sampling events.

3.1.3 Quality Assurance/Quality Control

Quality Assurance/Quality Control samples for Confirmational Monitoring sampling is addressed in Section 2.2 of this Plan.

3.1.4 Analytical Testing

Confirmational soil samples will be analyzed for organochlorine pesticides using USEPA Method 8081. A detailed description of analytical methods is presented in Section 5.0 of this Plan.

3.2 PRELIMINARY CONFIRMATIONAL PERCHED GROUNDWATER SAMPLING IN THE VADOSE ZONE

The Preliminary Confirmational Sampling Plan for the perched groundwater in the vadose zone is presented in this section. This plan will be finalized upon completion of the site excavation.

3.2.1 Points of Compliance

As defined in the CAP, the points of compliance for the perched groundwater in the vadose zone will be the six sampling points located on the west, south and east sides of the 62nd Avenue property (Figure 5). The points of compliance have been established at the sampling locations shown on Figure 5. Representative samples of the perched groundwater in the vadose zone, which occurs from the near surface to five feet bgs, will be collected from the established points of compliance.

3.2.2 Sample Locations

Perched groundwater in the vadose zone sample locations will be located on the west, south, and east property boundary of the 62nd Ave NE property, as shown on Figure 5. The sample locations will consist of shallow sumps constructed in accordance with the requirements as described in WAC 173-160-010 Subsection (3) (h), which excludes sumps from the provisions of Part Three -Resource Protection Wells WAC 173-160-510 Design and Construction - Surface Protective Measures. Sumps will be used in order to collect perched groundwater in the vadose zone which occurs above 5-feet bgs. A schematic detail of the sump construction is shown on Figure 6.

The sumps will be installed on the western, southern, and eastern property boundary as shown on Figure 5. Each sump will be constructed using 2-inch diameter, schedule 40 PVC screen equipped with 0.010-inch slotted screen from 6-inches bgs to the bottom of the sump. Each sump will be completed to a total depth of 5 feet bgs with a sand filter pack. A temporary bentonite seal will be placed from surface grade to six-inches below grade to prevent excess runoff of surface material from clogging the screened intervals.

The top of the sump will be secured and locked with an impermeable surface extending at least 1-foot from the sump head.

3.2.3 Monitoring and Sampling Frequency

The perched groundwater in the vadose zone samples will be collected from the sumps on a quarterly basis for the first 12 months after the completion of the cleanup and site restoration activities. However, based on the Interim Action monitoring results of the vadose zone interceptor trench, it is unlikely that sufficient perched groundwater in the vadose zone will be present for sample collection purposes during the dry season. Therefore, perched groundwater in the vadose zone samples will only be collected when sufficient perched groundwater is present in the sumps, which will most likely be restricted to the wet season.

Confirmational soil samples will be collected in the Preschool on a quarterly basis for the first 12 months after completion of the excavation. The analytical results will be reviewed by Ecology and the PLPs after four quarters to determine if additional soil monitoring at the Preschool is necessary.

Following the first 12 months of perched groundwater in the vadose zone monitoring, Ecology will evaluate the results of the analytical data. If the analytical results confirm that the site is in compliance with the cleanup criteria, PLPs will submit a request to Ecology for site closure. If the analytical results are above the cleanup levels, additional monitoring will be conducted.

3.2.4 Sampling and Handling Procedures

Perched groundwater in the vadose zone samples will be collected using a disposable bailer and decanted directly from the disposable bailer into a laboratory prepared glass sample jar. The sample jars will be completely filled, immediately sealed with Teflon lined screw caps, and placed in a field cooler on ice pending delivery to the analytical laboratory. The sample containers will be clearly labeled using a unique sample number and chain-of-custody procedures will be followed for all sampling events.

3.2.5 Analytical Testing

Perched groundwater in the vadose zone samples collected from each sump during the first 12 months will be analyzed for organochlorine pesticides using USEPA Method 8081. The method reporting limits (Practical Quantification Limit [PQL]) for all analytes will meet the data quality objectives established in the QAPP included with the CAP. Laboratory analysis will be conducted by Onsite Environmental in Redmond, Washington, which is accredited with Ecology.

4.0 WASTE CHARACTERIZATION SAMPLING

Waste characterization for soil will be based on analytical results from *in-situ* soil samples. Waste characterization will be based on the soil categories defined in the EMMP and CAP. Waste characterization for wastewater will be based on batch sampling from the aboveground storage tank and defined by the King County Industrial Waste Discharge Authorization (DA).

4.1 CATEGORY 3 SOILS

4.1.1 Toxicity Characteristic Leaching Procedure (TCLP) Sampling Protocols

Prior to the initiation of excavation activities *in-situ* soil samples will be collected from three locations where the analytical result of soil samples collected for the RI/FS meet the criteria of Category 3 Soils defined in the EMMP and CAP. The soil samples will be collected at the same location as the RI/FS soil samples for TCLP analysis. The results of the TCLP analysis will be used to determine whether the soil will be handled as a contained-in soil similar to Category 2 Soils or will be designated as a dangerous waste for incineration similar to Category 4 Soils as described in the CAP.

4.1.2 Sampling Frequency

Soil samples will be collected in close proximity to the following previous sampling locations: RI/FS Subarea 1-B2 and B3; Subarea 2-B18 and S10; and, Subarea 5-B3 at a depth of 3-inches bgs (Figure 1). One split field duplicate for TCLP analysis will be collected for QA/QC.

4.1.3 Analytical Testing

All three soil samples will be analyzed for TCLP Pesticides by USEPA Method 1311/8081 by OnSite Environmental in Redmond, Washington.

4.2 WASTEWATER

Wastewater generated during the site cleanup will consist of decontamination washwater, recovered vadose zone groundwater, and captured surface water. Decontamination washwater will be contained within a lined and bermed area, as discussed in the CAP, and transferred to a temporary 500-gallon above ground storage tank. Vadose zone groundwater and/or surface water captured and contained as discussed in the Erosion Control Plan, will be transferred to the same above ground storage tank for sampling prior to discharge to the sanitary sewer under the existing DA.

4.2.1 Waste Water Sample Location

Waste water samples will be collected directly from the above ground storage tank.

4.2.2 Wastewater Sample Collection and Handling Procedures

The wastewater sample will be decanted directly from a disposable bailer into a laboratory prepared glass sample jar. The sample jars will be completely filled, immediately sealed with Teflon lined screw caps, and placed in a field cooler on ice pending delivery to the analytical laboratory. The sample containers will be clearly labeled using a unique sample number and chain-of-custody procedures will be followed for all batch sampling events.

4.2.3 Sampling Frequency

During the final cleanup action, a surface water sample will be collected from the above ground storage tank on a batch basis as part of the discharge requirements of the DA. Batch samples will be collected when the tank has been nearly filled with wastewater collected from stormwater runoff and equipment decontamination. No QA/QC samples will be collected of the wastewater.

4.2.4 Analytical Testing

Surface water samples collected from the above ground storage tank will be analyzed for Organochlorine Pesticides by USEPA Method 8081 by OnSite Environmental in Redmond, Washington. A standard 5-day turnaround time will be used for surface water samples collected from the above ground storage tank.

5.0 ANALYTICAL METHODS AND TURNAROUND TIMES

All samples for Performance Monitoring, Confirmational Monitoring, and waste characterization will be analyzed for organochlorine pesticides using USEPA Method 8081. The method reporting limits (Practical Quantification Limit [PQL]) for all analytes will meet the data quality objectives established in the QAPP included with the CAP. Laboratory analysis will be conducted by Onsite Environmental in Redmond, Washington, which is accredited with Ecology.

During excavation activities, confirmation soil samples will be analyzed on a 24-hour turnaround time in order to expedite the overall cleanup action. Confirmational soil samples will be collected by a Farallon geologist from each individual excavation area immediately upon completion of the final excavation depth. These soil samples will be transported by courier to Onsite Environmental on a daily basis. Verbal results will be provided by the laboratory as soon as they are available in order to expedite the backfill and restoration of the site, and to prevent potential runoff and erosion from exposed excavation areas.

Farallon will obtain analytical results from the laboratory in electronic and hard copy format. The analytical results will be compiled into a database for data management. Paper copies of the analytical data will also be maintained in the project files. The necessary tables will be generated from the database and may be imported into the word-processing programs for reports. All data will undergo a QA/QC review at the time of receipt in accordance with the CAP.

6.0 SAMPLING DOCUMENTATION

Documentation of field activities will include field log documentation, sampling event data forms, Chain-of-Custody forms, and sample and waste labels. Documentation generated during the field program will be included in the Final Summary Report and retained in the project file.

Field Report Form

Field personnel will be required to keep a daily field log. Field notes will be as descriptive and as inclusive as possible, allowing independent parties to reconstruct the sampling situation from the recorded information. Language will be objective, factual, and free of inappropriate terminology. A summary of each day's events will be completed on a three-part Field Report form. At a minimum, field documentation will include the date, job number, project identification and location, weather conditions, sample collection data, field equipment used, and any activities performed in a manner other than specified in the CAP. In addition, if other forms are completed or used (e.g., Chain-of-Custody form, maps, etc.) they will be referred to, and attached to, the Field Report form. Field personnel will sign the Field Report form.

Chain-of-Custody

The written procedures that are followed whenever samples are collected, transferred, stored, analyzed, or destroyed are designed to create an accurate written record which can be used to trace the possession and handling of the sample from the moment of its collection through analysis and reporting of analytical values. This written record, the Chain-of-Custody form, will be filled out by the field sampling team at the time the sample is obtained.

All samples submitted to the laboratory are accompanied by the Chain-of-Custody record. This form is checked for accuracy and completeness, and then signed and dated by the laboratory sample custodian accepting the sample. At the laboratory, each sample is assigned a unique, sequential laboratory identification number which is stamped or written on the Chain-of-Custody form.

All samples are held under internal Chain-of-Custody in the Sample Control room using the appropriate storage technique (ambient, refrigeration, frozen). The laboratory Project Manager assigned to a particular client is responsible for tracking the status of the samples throughout the laboratory. Samples are signed out of the Sample Control room in a sample control logbook by the analyst who will prepare the samples for analysis.

The Chain-of-Custody form includes the following information: site name, sample identification number (assigned by the sampler in the field), sample date, sample location, and type of analysis required (if any). Whenever the sample is transferred from one party to another, both parties sign the Chain-of-Custody form and record the date and time of the transfer. In this manner, the sample integrity is insured from collection through analysis.

Sample Label and Numbering

Sample labels are filled out and affixed to appropriate containers immediately prior to sample collection. The label is filled out in indelible ink and includes the following information: job number and name, sample identification number, date, analytes, preservative(s), if any, and the sampler's initials.

The collected samples will be labeled based on the general excavation area, the specific excavation area, cell, and quadrant or sidewall within the cell from where the soil sample was collected. For example, samples collected from the Exterior Excavation Area 1 from the west sidewall in Cell A of Lift 1 will be labeled with the format EXT1A-WW1', and samples collected from Interior Excavation Area 2 (inside the residence), from the north sidewall will be labeled with the format INT2-NW1'. A soil sample collected from the bottom of Exterior Excavation Area 1, from the northwest quadrant of Cell A will be labeled with the format EXT1A-BTMNW1'. Split samples collected by, or provided to, Ecology will be labeled the same as the Farallon samples with the exception of an "EC-" prefix to the sample number.

Waste Material Label

The waste material labels are filled out and affixed to the appropriate waste container immediately upon filling. The label is filled out in indelible ink and includes the following information: job number and name, address where waste was generated, contents of the container, operation, date, consultant's name and phone number, and sampler's initials.

FIGURES